UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Pacific Southwest Forest and Range
Experiment Station
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FS X Ref: 5200 70.01

RECD AUG 20 1970 RS

35.42853 -120.73828

REPLY TO: 2300 Recreation

August 18, 1970

SUBJECT: Investigation of California Live Oak Failure on Cerro Alto Campground, Los Padres N.F., August 4-5, 1970

TO: George O. Witbeck
Chief Criminal Investigator
R-5

RB

Preliminary Summary

Two days of on-the-site study resulted in the following preliminary summary of observations and conclusions.

General

The subject tree, a California live oak, exhibits a high proportion of defect in the butt portion of (1) the standing bole, of (2) the bole which fell and resulted in an accident, and of (3) a third "triplet" bole stub resulting from a failure some time in the past.

Defect

The defect consists primarily in loss of mechanical strength in the triple butt as the result of decay fungi activity. Several decay infections were discovered, but the one leading to the most serious defect apparently resulted from a failure of the small triplet bole at about 17 inches above ground. At that time, many years ago, the failure of the small bole pulled out a core of wood from the center of the small bole down to near ground level. Via this channel, spores penetrated to initiate infection near ground level more or less in the central area where the three boles were joined.

The loss of mechanical bending strength is rather difficult to estimate for the failure bole, but was probably on the order of 50 percent at 28 inches above ground (where the bole might reasonably have been sampled before failure and from where my increment core samples were taken). Bending strength was probably the most important factor, since one side was completely rotted out and since considerable leverage must have been applied to the butt as a result of large spreading limbs and the reported lean of the bole prior to failure. At the actual line of failure, the rot was more extensive and the loss of strength would have been more pronounced.

Detection and evaluation of defect

Numerous apparent defects are visible in the subject tree and other nearby trees. The apparent defects and indicators often suggest the desirability of more intensive inspection to determine the extent and

degree of defect for evaluation of hazard. Unfortunately, the thick bark of live oak precludes much evaluation of defect by sounding the trunk with an axe or hammer. Since increment borers are not in use on this district, according to my information, the best means for sampling suspected wood is not available. Visual inspection of apparent external defect, or of overmature trees with no visible defect, will not produce as reliable results as would an increment borer.

Subsequent to the old small-bole failure of the subject tree, callousing and further growth of the other two boles served to partially conceal the wound and the channel that extended down into the butt. Close inspection would not necessarily have suggested that the subject tree was any more defective than other nearby trees (some of which don't look too good on the basis of visual inspection alone).

Hazard evaluation

On the basis of information supplied by Dan Whittaker, my tables, and assuming that the tree had been expected to fail during the current season of campground use, the hazard rating would have been 320 unless the hazard were reduced. The expected loss and hazard rating would be reduced in proportion to any lower estimate of the probability of failure; i.e., if the probability of failure had been estimated at 20 percent for this season, the rating would then have been 64. On the basis of present data, the rating in a given situation for oak is generally lower than it would be for a conifer. The maximum value for a 60-inch d.b.h. conifer threatening humans would be 3760.

If the tree had been given this type of hazard rating, the question of whether or not the rating was unacceptably high is an administrative decision. All trees large enough to cause any damage in case of any type of failure from any cause represent some degree of potential hazard. And all trees will fail at some time and under certain conditions. Our task is primarily to evaluate the hazard and to reduce it when it becomes unacceptably high.

General

A detailed account of the investigation on the ground will be supplemented by further comments, by laboratory culture of the decay samples, microscopic and X-ray examination of increment core samples, and by computer analyses of reported failures of live oak, other oaks, and tanoak. Slides are available of points of decay entry, sequential sectioning of the bole, etc., but will not be submitted unless required.

At the time of examination, the butt section below the point of collapse was purposely not subjected to increment coring or other significant destructive sampling. If it would be acceptable, and would serve any purpose, additional cores could be taken through the sound bark into the area of failure, identified and described, and submitted to us for additional examination.

Lee A. Paine

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Forest Pathologist